

# XIV Polish Workshop on Relativistic Heavy-Ion Collisions: Interplay between soft and hard probes of heavy-ion collisions



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## Rapidity distributions of pions in p+p and Pb+Pb collisions at CERN SPS energies

*Saturday, 6 April 2019 16:40 (20 minutes)*

Our presentation will be based on our recent paper [1].

The centrality and energy dependence of rapidity distributions of pions in Pb+Pb reactions can be understood by imposing local energy-momentum conservation in the longitudinal “fire-streaks” of excited matter. With no tuning nor adjustment to the experimental data, the rapidity distribution of pions produced by the fire-streak which we obtained from Pb+Pb collisions reproduces the shape of the experimental pion rapidity distribution in p+p interactions, measured by the NA49 Collaboration at the same energy per nucleon. The observed difference in the absolute normalization of this distribution can be explained by the difference in the overall energy balance, induced by baryon stopping and strangeness enhancement phenomena occurring in heavy ion collisions. We estimate the latter effects using a collection of SPS experimental data on  $\pi^\pm$ ,  $K^\pm$ , net  $p$ , and  $n$  production in p+p and Pb+Pb reactions. We discuss the implications of the above findings for the understanding of particle production phenomena in both hadron-hadron and nucleus-nucleus collisions. In addition, we comment on the excellent accuracy in the determination of the energy balance at the SPS, which can be used as an independent tool to test different models for hadronic or nuclear reactions.

[1] A. Rybicki, A. Szczurek, M. Kielbowicz, A. Marcinek, V. Ozvenchuk, Ł. Rozpłochowski, Phys. Rev. C **99** (2019), 024908

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